

CLIPPEDIMAGE= JP405343415A  
PAT-NO: JP405343415A  
DOCUMENT-IDENTIFIER: JP 05343415 A  
TITLE: BIPOLAR TRANSISTOR

PUBN-DATE: December 24, 1993

INVENTOR-INFORMATION:

NAME

MATSUMOTO, NAOYA

ASSIGNEE-INFORMATION:

NAME

NEC CORP

COUNTRY

N/A

APPL-NO: JP05012982

APPL-DATE: January 29, 1993

INT-CL (IPC): H01L021/331; H01L029/73

US-CL-CURRENT: 257/514, 257/515, 257/586

ABSTRACT:

PURPOSE: To enhance the degree of integration by forming a trench which reaches a collector embedded region and filling up a collector lead out conductor to be connected to the collector embedded region herein.

CONSTITUTION: An emitter region 22 is ring-shaped and envelops a trench 25 at a width of  $0.3\mu\text{m}$ . The outer peripheral part 28 is opposed to a P<SP>+</SP> graft base region 23 by way of an intrinsic base region 21 while an inner peripheral part 29 faces the trench 25 and partially forms a side wall of the trench 25. Furthermore, the whole side walls of the trench 25 are covered with an insulation film 42, which is filled up in the trench 25, thereby electrically insulating the trench from the intrinsic base region 21 and the emitter region 22. There is formed a collector lead out conductor 27 connected to a collector embedded region 24 by a contact 41 at the bottom of the trench 25. This construction makes it possible to provide a high degree of integration of bipolar IC.

CLIPPEDIMAGE= JP405335329A  
PAT-NO: JP405335329A  
DOCUMENT-IDENTIFIER: JP 05335329 A  
TITLE: SEMICONDUCTOR DEVICE AND ITS MANUFACTURE

PUBN-DATE: December 17, 1993

INVENTOR-INFORMATION:  
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ASSIGNEE-INFORMATION:  
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APPL-NO: JP04163922  
APPL-DATE: May 29, 1992

INT-CL\_(IPC): H01L021/331; H01L029/73 ; H01L027/12

ABSTRACT:

PURPOSE: To provide a high performance bipolar transistor structure by forming a trench groove on a surface Si layer extending as far as the oxide film layer below it, forming an emitter area on the side wall of that trench groove, and also forming a base area which surrounds it in its side direction.

CONSTITUTION: In an SOI structure, a trench groove 9 which extends as far as a lower oxide film 2 is provided on a silicon layer 3, and the side wall of that trench groove 9 is provided with an emitter area 4. As a result, the emitter area 4 is completely surrounded by a base area 5, so, the joining area other than the effective bipolar operation area is significantly reduced. In other words, this structure, being a horizontal bipolar transistor, is equivalent to a vertical bipolar transistor formed with respect to the trench side wall, and so there is little, if any, joining area other than the effective bipolar operation region. As a result, unnecessary increase in joining capacity between the emitter and the base can be suppressed.